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Research Article

STUDY AND ESTIMATION OF SPECIES RICHNESS OF AVIAN FAUNA IN SELECTED SITES OF INDORE CITY (M.P.)

Priya Gaur[1], Shrivastava C. S[2] and Gaherwal S[1]*

[1]Department of Zoology, Government Holkar (Model, Autonomous) Science College, Indore (M.P.), INDIA
[2]Department of Zoology, Government College Mundi, Khandawa (M.P.), INDIA

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A B S T R A C T

A study was conducted from January 2018 to December 2018 to record the number of individuals of avian fauna observed in Meghdoot Garden, Nehru Park, Lalbagh and Pipliyapala Regional Park. During this study, species richness (S) with respect to seasonal changes was recorded. Highest Species richness was recorded in Regional Park (S = 52) and lowest was observed in Nehru park (S = 30). The maximum numbers of individuals were observed in summer season (Pipliyapala Regional Park), followed by 452 in Lalbagh (summer) and least were recorded in Nehru park (277) in Rainy season. So, it can be concluded that these study sites are of great importance in terms of sustentation of avian diversity in the city. Thus, the present study clearly brought out the need for conserving these greenspaces in urban cities.

INTRODUCTION

There are several ways by which avian diversity can be protected and enhanced. These following measures can increase species richness. Firstly, maintaining and replanting understory vegetation, removing grazing stock and allowing native grasses and legumes to grow, conserving or preserving mixture of local trees and shrubs. Old trees should be maintained and if this is not viable then nest boxes should be provided. Flowering plants must be grown to attract many species. Fallen trees and plant debris should be allowed to break down naturally and lastly, trees must be grown in larger number having maximum canopy area at the periphery of the desired area where conservation is required (Barrett *et al.,* 1994). Bird species richness is probable to be enhanced by increasing site area and imparting rough grass and water bodies in urban green spaces (Chamberlain et *al.,* 2007).

Green spaces and trees confer to a number of environmental functions in urban environments, such as the endurance of urban dwelling species (e.g. bird species). There is a correlation between green space quality (structural and spatial attributes) and the diversity of avian fauna (Sharma and Shukla, 2015). The most important parameters of the bird study are the species richness, their density and diversity (Krebs, 1985).

Corresponding author:* **Gaherwal S
Department of Zoology, Government Holkar (Model, Autonomous) Science College, Indore (M.P.), INDIA

The bird assemblages are affected by various factors like food availability, the size of the wetland and the inorganic changes in the wetland (Lagos *et al.,* 2008). Fenced area where there is no human interaction has higher species richness but has lower species diversity of avian fauna in both dry and wet season. But in disturbed habitat there is high species richness and diversity in the rainy (wet) season (Mengesha *et al.*, 2011).

MATERIALS AND METHODS

Study sites: All the study sites were confined to the Indore city of Madhya Pradesh.

1. Meghdoot Garden
2. Nehru Park
3. Lal Bagh
4. Pipliyapala Regional Park

Study period: The study was conducted for a period of one year. The surveys (10 in each season) were conducted in morning and evening in each site respectively.

Identification aids: Camera and binoculars were used to locate and count birds with the help of Birds of the Indian Subcontinent by Richard Grimmett, Carol Inskipp and Tim Inskipp (2014).

Study and survey method: Point count method was used. In this method the observers sits at different stations within a study site for equal time intervals and records the observed species and its individuals (Bibby, 2000).

MEGHDOOT GARDEN

NEHRU PARK

LALBAGH

PIPLIYAPALA REGIONAL PARK

RESULTS

In the present study, line transect and point count methods were adopted for counting the total number of bird species in all three seasons (winter, summer and rainy season) from January – December 2018.

Species richness in Meghdoot Garden

In winter season total 341 individuals were observed which belonged to thirty five species out of which Blue rock pigeon were highest and Cattle egret was in least number.

In summer season this number increased to 431 individuals which belonged to thirty six bird species; in which Blue rock pigeon and Red wattled lapwing were in maximum number and Thick billed flowerpecker was one in number.

In rainy season, 298 individuals of thirty five bird species were recorded out of which Red vented bulbul were maximum in count and White throated fantail flycatcher were least in number.

Species richness in Nehru Park

In winter season total 324 individuals were observed which belonged to thirty species out of which Blue rock pigeon number were highest and Jungle crow was in least number.

In summer season this number increased to 417 individuals who belonged to thirty three bird species; in which Red wattled lapwing were in maximum number and Siberian stonechat was least in number.

In rainy season, 277 individuals of thirty one bird species were recorded out of which Rose ringed parakeets were maximum in count and Shikra was least in number.

Species richness in Lalbagh

In winter season total 352 individuals were observed which belonged to thirty five species out of which Blue rock pigeon number were maximum and Jungle crow was in least number.
In summer season this number increased to 452 individuals who belonged to thirty nine bird species; in which Blue rock pigeon and Red wattled lapwing were in maximum number and Small minivet was one in number.

Table 1 List of all species recorded at all four study sites with seasonal disparity

Scientific Name	Meghdoot Park	Nehru park	Lal bagh	Regional Park	winter	summer	rainy
Pavo cristatus				yes			yes
Columba livia	yes	yes	yes	yes	*yes*	*yes*	*yes*
Streptopelia chinensis	yes	yes	yes	yes	*yes*	*yes*	*yes*
Streptopelia senegalensis	yes	yes	yes	yes	*yes*	*yes*	*yes*
Apus affinis		yes	yes	yes	*yes*	*yes*	*yes*
Centropus sinensis	yes		yes	yes	yes	yes	yes
Clamator jacobinus				yes	*yes*	yes	
Eudynamys scolopaceus	yes	yes	yes	yes	*yes*	yes	yes
Ardeola grayii				yes	*yes*	yes	yes
Bubulcus ibis	yes	yes		yes	*yes*	yes	yes
Vanellus indicus	yes	yes	yes	yes	*yes*	yes	yes
Elanus caeruleus			yes	yes			yes
Pernis ptilorhynchus				yes			yes
Accipiter badius	yes	yes		yes	*yes*	yes	yes
Milvus migrans	yes	yes	yes	yes	*yes*	yes	yes
Athene brama	yes	yes	yes	yes	*yes*	yes	yes
Ocyceros birostris	yes	yes	yes	yes	*yes*	yes	yes
Psilopogon haemacephalus	yes	yes	yes	yes	*yes*	yes	yes
Merops orientalis	yes	yes	yes	yes	*yes*		
Halcyon smyrnensis	yes	yes	yes	yes	*yes*	yes	yes
Psittacula cyanocephala				yes		yes	yes
Psittacula eupatria	yes			yes	*yes*		yes
Psittacula krameri	yes	yes	yes	yes	*yes*	yes	yes
Pericrocotus cinnamomeus	yes		yes	yes	*yes*	yes	yes
Coracina javensis			yes	yes		yes	
Oriolus kundoo		yes	yes	yes		yes	
Aegithina tiphia	yes	yes	yes	yes	*yes*	yes	yes
Dicrurus macrocercus	yes	yes	yes	yes	*yes*	yes	yes
Rhipidura albicollis	yes	yes		yes	*yes*	yes	yes
Dendrocitta vagabunda	yes	yes	yes	yes	*yes*	yes	yes
Corvus splendens	yes	yes	yes	yes	*yes*	yes	yes
Corvus macrorhynchos		yes	yes	yes	*yes*	yes	yes
Terpsiphone paradisi	yes			yes		yes	
Dicaeum agile	yes	yes		yes		yes	yes
Leptocoma zeylonica		yes		yes		yes	yes
Cinnyris asiaticus	yes		yes	yes	*yes*	yes	yes
Euodice malabarica	yes		yes	yes	*yes*	yes	yes
Passer domesticus	yes	yes	yes	yes	*yes*	yes	yes
Motacilla maderaspatensis			yes	yes		yes	
Motacilla alba				yes		yes	
Machlolophus xanthogenys	yes			yes			yes
Prinia socialis			yes	yes	*yes*	yes	yes
Orthotomus sutorius	yes	yes	yes	yes	*yes*	yes	yes
Hirundo smithii			yes	yes		yes	
Hirundo rustica	yes		yes	yes		yes	
Ptyonoprogne concolor	yes	yes		yes	*yes*	yes	yes
Pycnonotus cafer	yes	yes	yes	yes	*yes*	yes	yes
Phylloscopus trochiloides	yes			yes	*yes*	yes	
Zosterops palpebrosus	yes		yes	yes	*yes*	yes	yes
Turdoides striata	yes	yes	yes	yes	*yes*	yes	yes
Gracupica contra	yes		yes	yes	*yes*	yes	yes
Acridotheres tristis	yes	yes	yes	yes	*yes*	yes	yes
Saxicoloides fulicatus	yes	yes	yes	yes	*yes*	yes	yes
Copsychus saularis	yes	yes	yes	yes	*yes*	yes	yes
Cyornis tickelliae			yes	yes	*yes*	yes	yes
Ficedula parva		yes	yes	yes	*yes*	yes	yes
Saxicola maurus		yes		yes		yes	
Oenanthe fusca			yes	yes	*yes*	yes	

Keys = (yes) means presence of species

In rainy season, 301 individuals of forty four bird species were recorded out of which Rose ringed parakeet were maximum in count and Coppersmith barbet were least in number.

Species richness in Pipliyapala Regional Park

In winter season total 370 individuals were observed which belonged to forty three species out of which Blue rock pigeons were highest in number and Alexandrine parakeet was in least number.

In summer season this number increased to 496 individuals who belonged to fifty two bird species; in which Red wattled lapwing were in maximum number and Pied cuckoo was least in number.

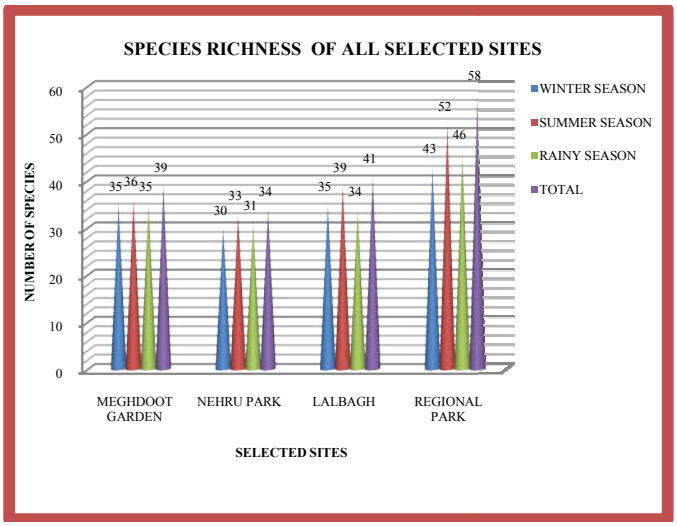
In rainy season, 327 individuals of forty six bird species were recorded out of which Blue rock pigeon were maximum in count and Shikra was least in number.

In the present investigation the minimum numbers of species were observed in Nehru Park (30) in winter season and

maximum species were recorded in Pipliyapala Regional Park (52). Total 58 species of birds were reported from all the sites collectively.

Table 2 Season wise Species Richness (S)

Sites season	Meghdoot Garden	Nehru Park	Lalbagh	Regional Park
Winter season	S = 35	S = 30	S = 35	S = 43
Summer season	S = 36	S = 33	S = 39	S = 52
Rainy season	S = 35	S = 31	S = 34	S = 46
Total species	S = 39	S = 34	S = 41	S = 58



Graph 1 Species richness of all the sites

DISCUSSION

Species richness is a vital tool in evaluating the importance of greenspaces quantitatively (Aouissi *et al.,* 2017). In the present study, the species richness among all four study sites was observed and highest value recorded was 52 (Pipliyapala Regional park) and the lowest was 34 (Nehru park).

Interestingly, population of Blue rock pigeon was highest with frequency of 6 in the overall season wise study. This result is also mentioned in the study of Menon and Mohanraj (2016). On the contrary, they highlighted the successful invasion of House crow in their study but it was least in number in our present study.

Tripathi *et al.* (2015) also reported species richness of 122 species of birds from Chuhiya forest, district Rewa (M.P.). These results are in agreement with the study of Dapke *et al.* (2015) who observed a species richness of 62 terrestrial bird species.

Similarly, we have found fifty eight species collectively in our study sites over a period of one year. Since several other workers have worked on calculating the number of individuals and they also highlighted several conservation efforts in their area. Kanaujia and Kushwaha (2015) worked on the conservation of Long billed vultures in a remote village called Orchha (M.P.). Factors like seasonal and temporal variation also affects species richness (Gaur *et al.,* 2019a, b). Our study also pinnacles the urgent need for protection of green spaces in cities so that they can conserve several individuals of bird species.

The maximum number of individuals was 496 in Regional Park and minimum were 277 in Nehru Park. So, it can be concluded that these study sites are of great importance in terms of sustentation of avian diversity in the city. Thus, the present study clearly brought out the need for conserving these greenspaces in urban cities. Thus, the results of present study are supported by above mentioned authors.

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